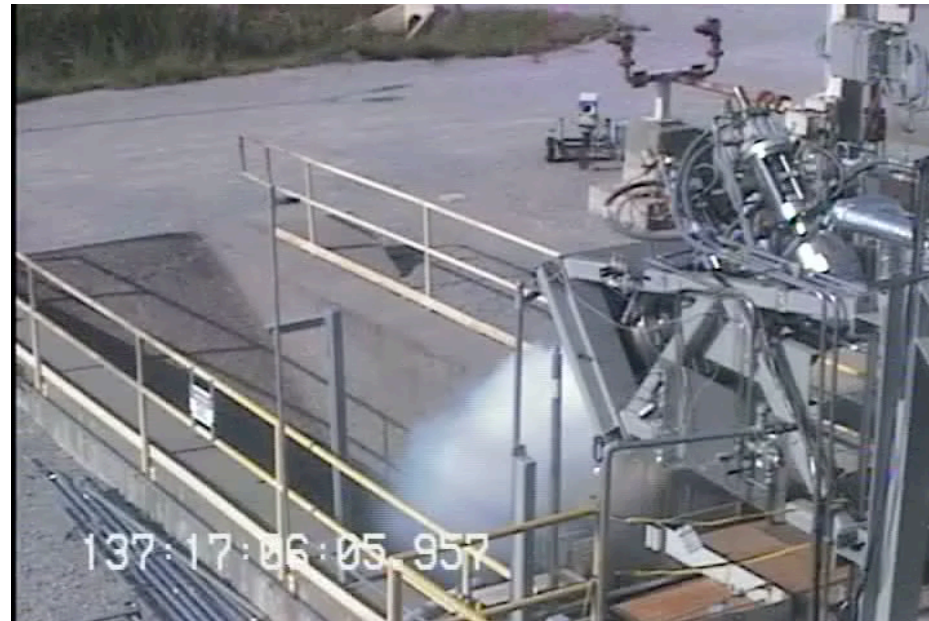




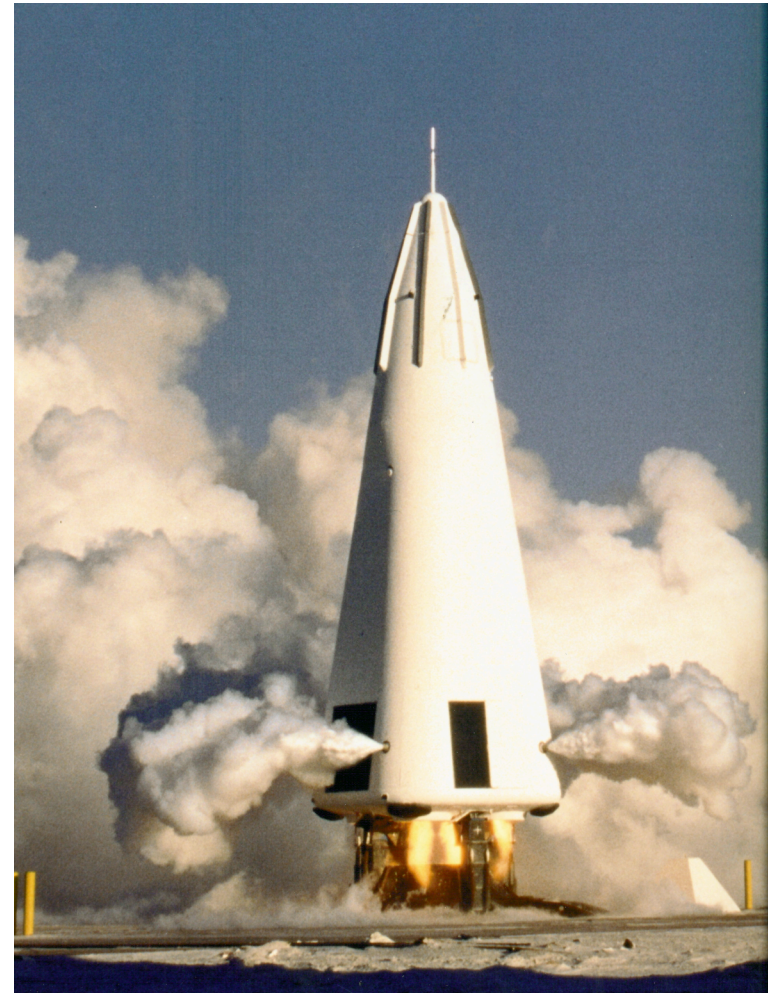
USRA/PSF Suborbital Workshop

Pat Bahn,
TGV Rockets
3209 N Flood Ave
Norman OK, 73072



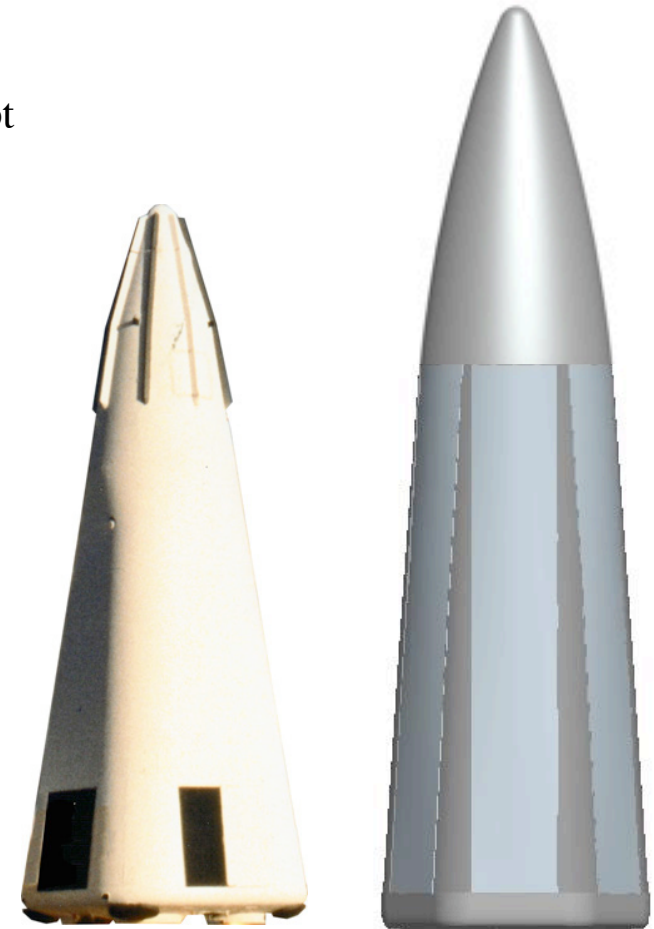
Background: DC-X Reusable Suborbital

- Delta Clipper - Experimental
- Developed 1990's by Strategic Defense Initiative Office (Star Wars)
- Built by McDonnell-Douglas
- Transferred to NASA - DC-XA
- \$80M Government investment
- 13 successful flights
- Program killed by line-item-veto
- Technology abandoned by DoD
- Avionics and software spun-out under Pete Conrad (cmdr. Apollo 12)
- Software and avionics team still together



TGV Rockets & DC-X Heritage

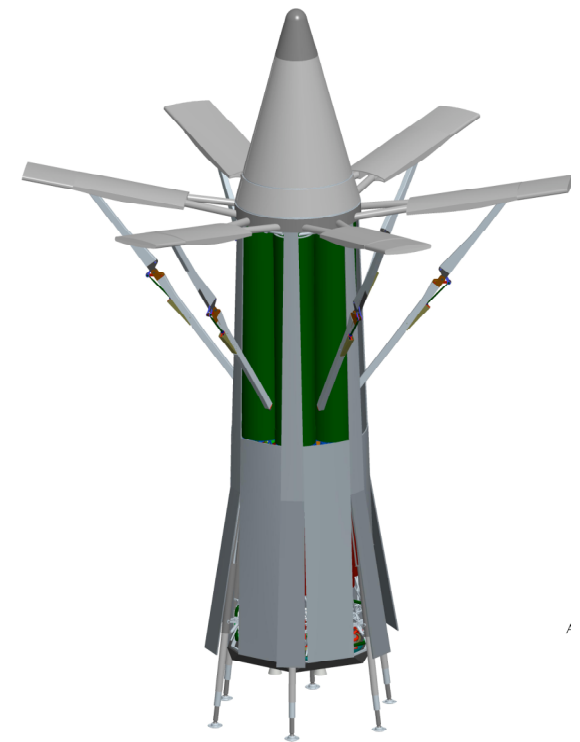
- Restart of Delta Clipper (DC-X) Project
 - CEO involved in support of program (1989-1995)
 - 1996 Program killed/TGV formed to commercialize concept
 - Design/Operate VTVL RVL for DoD/Commercial Market
- Commercialization of the DC-X
 - start with DC-X concept
 - improve operability/responsiveness/reliability
 - reduce logistical tail
 - improve mobility
 - improve performance
- Continuity of Team and Technology
 - DC-X Team Members
 - Chief Engineer + 4 key disciplines
 - Reuse software and avionics design

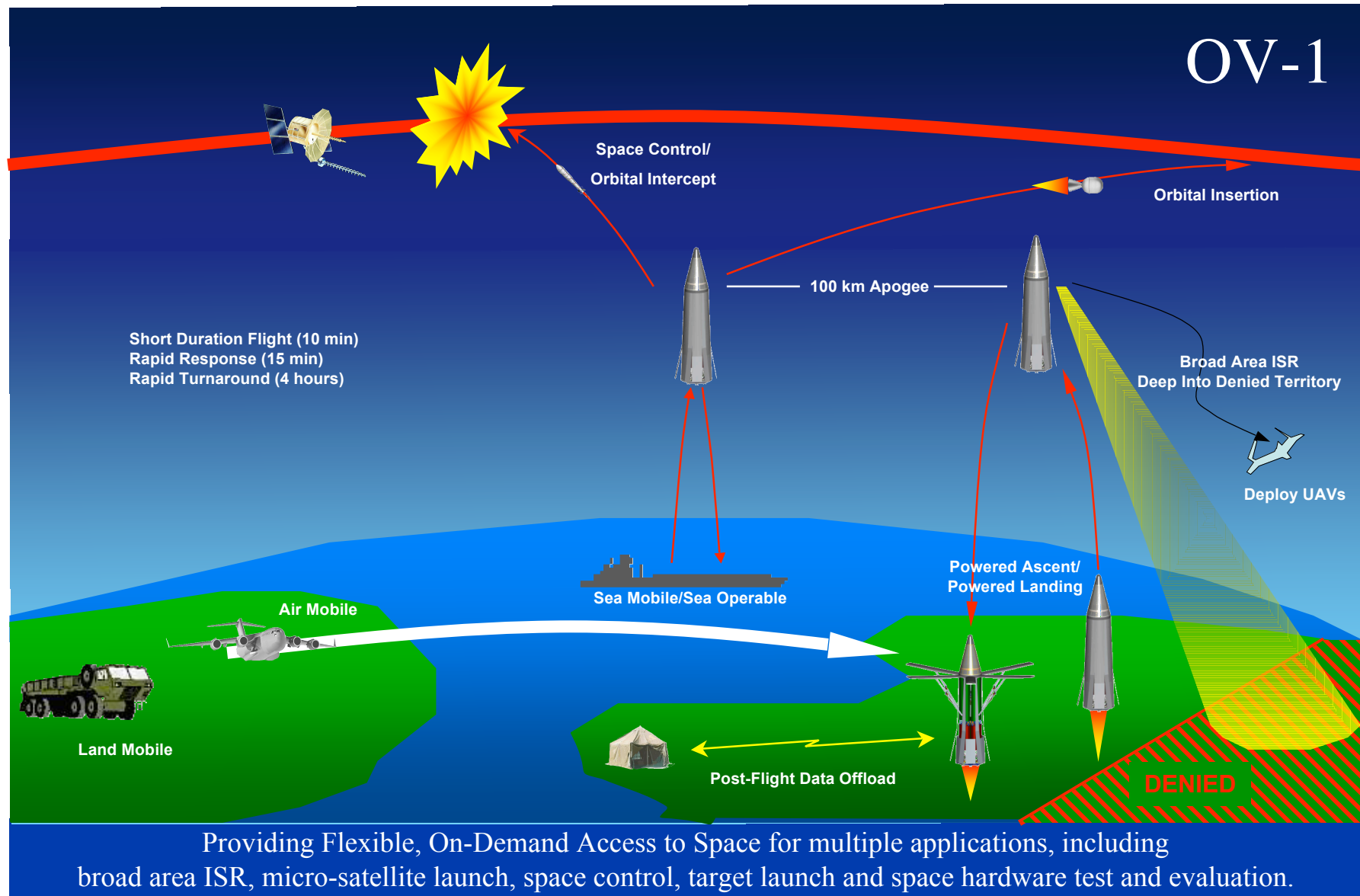


“Leverages Government Investment into New Launch Technologies”

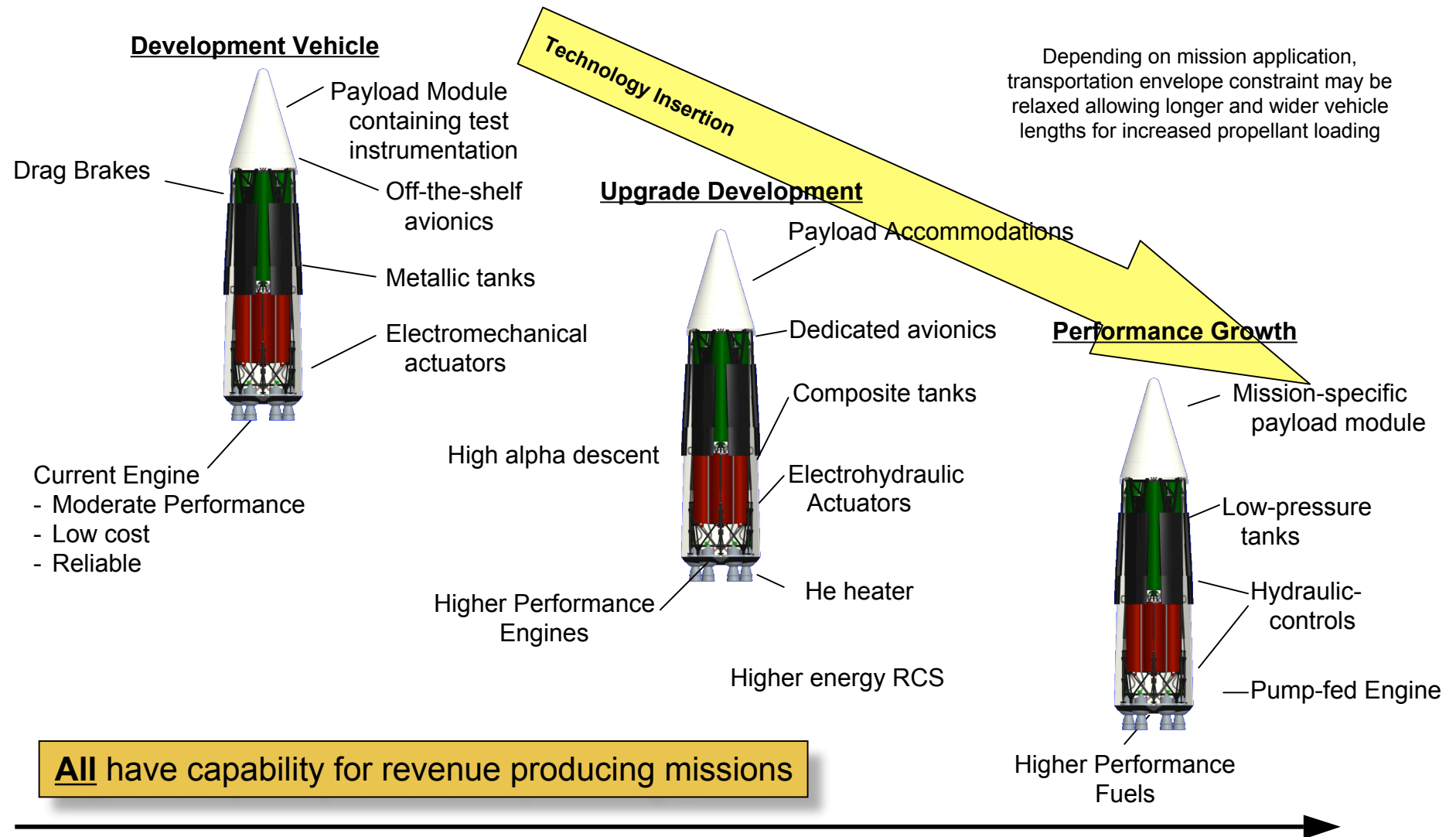
Enabling Capabilities

- Fieldable-Transportable Responsive Launch Vehicle
 - Self-contained system transportable anywhere in the world
 - Launch and land with minimal infrastructure
 - Rapid turn-around (less than 8 hrs)
- Large, Heavy lift to Near Space
 - Large volume: easy installation, large critical dimensions
 - Performance: big suborbital payloads - small orbital payloads
- Tailored/Controllable High Altitude Deployment
 - Low speed-to-stationary release
 - Moderate supersonic Mach boost
 - 0-100 deg pointing and deployment attitudes
- Returnable Payload Service
 - Lower user costs
 - Payload retrieval
 - Intact abort capability





Evolutionary Development Path





Platform Capabilities

1000 KG

100 KM

Price Target \$500-1000/KG